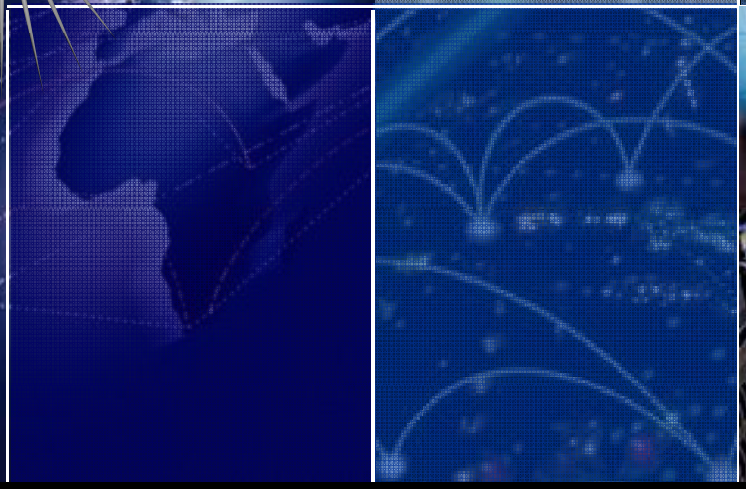
Virtualization

Cloud Computing

The Next Internet



David Bernstein
VP/GM, Office of the CTO
Cloud Computing Project

Cisco Cloud Strategy

Build Right Products
Unified Fabric
Unified Compute
Virtualization Aware

Technology
Enhanced IP core with tight coupling to Software

Multi-Phased
Standalone Clouds
to
Enterprise-Class
to
Intercloud

Services/ Reference SW
Services-led Cloud blueprints
Reference software stacks

Open Standards
Accelerate Cloud deployment and federation through Cloud standards

© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Cloud Service Models

Application

- SaaS

Cisco webex · Microsoft Office Live Beta · salesforce.com Success On Demand

Abstract Services

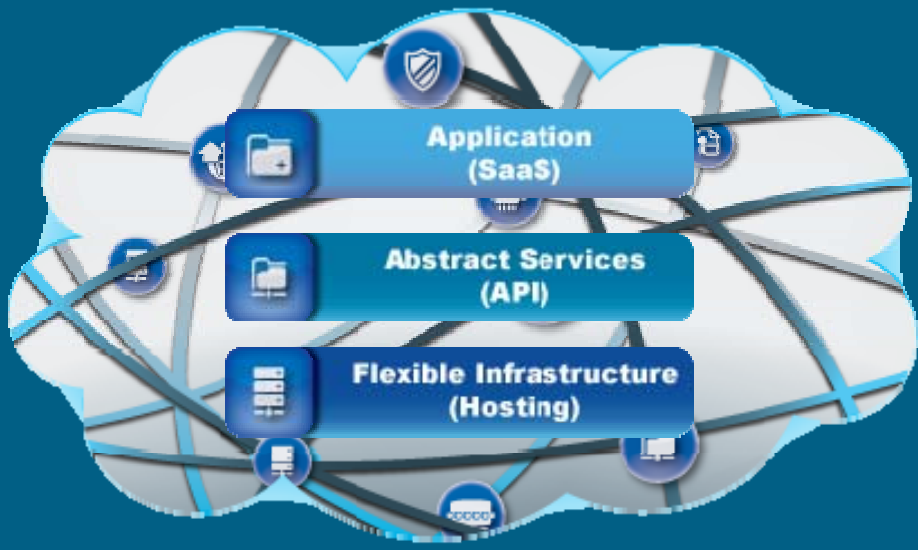
- Services and Platforms for New Applications (via new APIs)

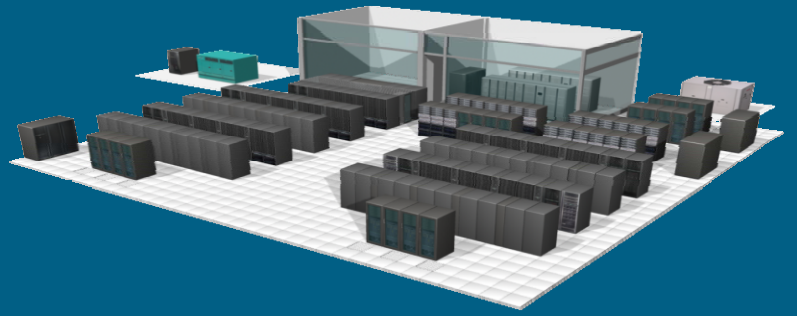
amazon web services S3 · Google App Engine · Windows Azure

Flexible Infrastructure

- "Virtual Private Datacenter"
- Familiar DC Resources Delivered On-Demand

amazon.com EC2 · MOSSO the hosting system · GOGRID beta A ServePath Company





IT Foundation

© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Next Wave of Application Architecture

Cloud?

Web/Internet

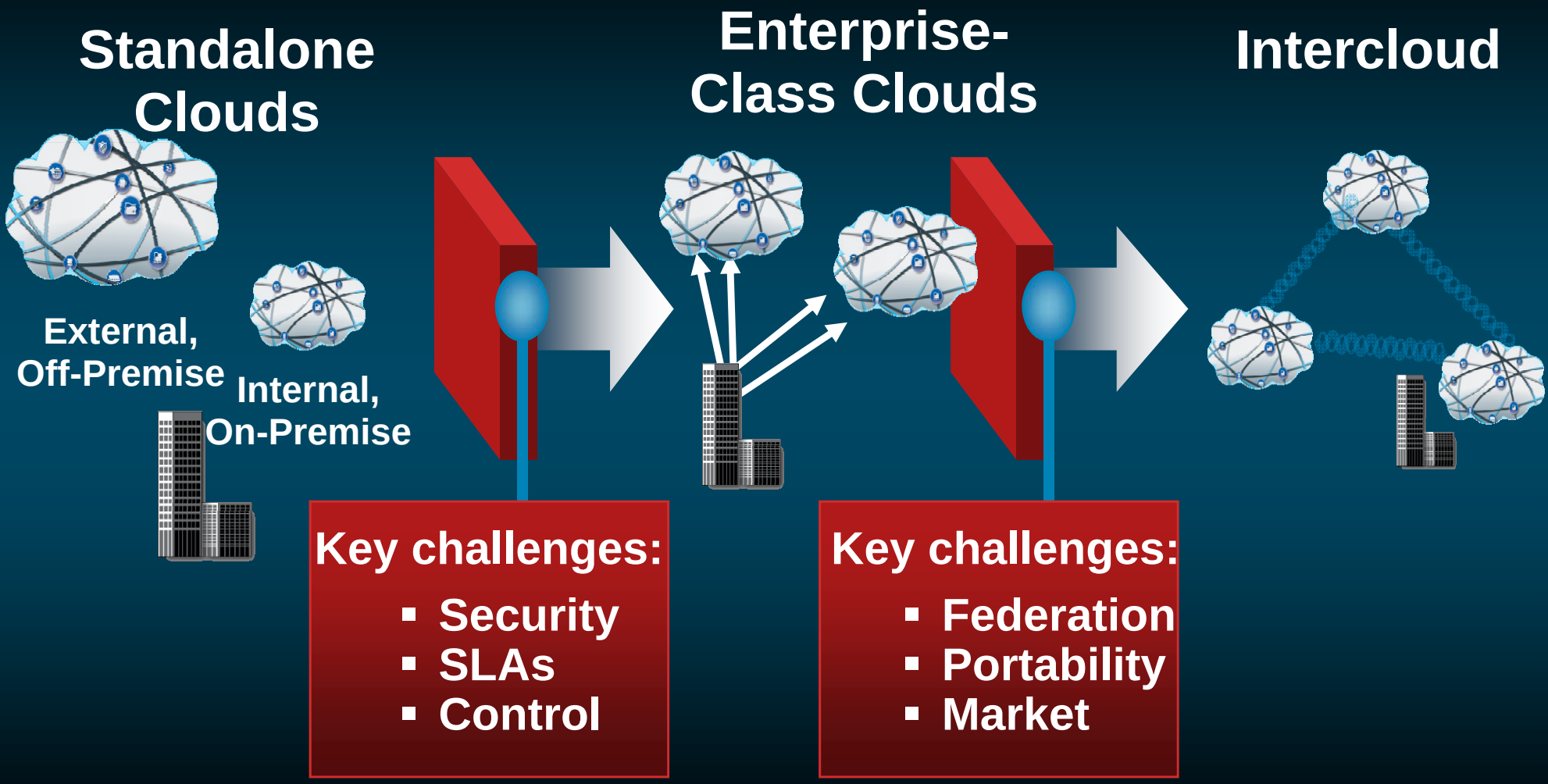
Minicomputer/PC
(Client/Server)

Mainframe

1960 1970 1980 1990 2000

© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

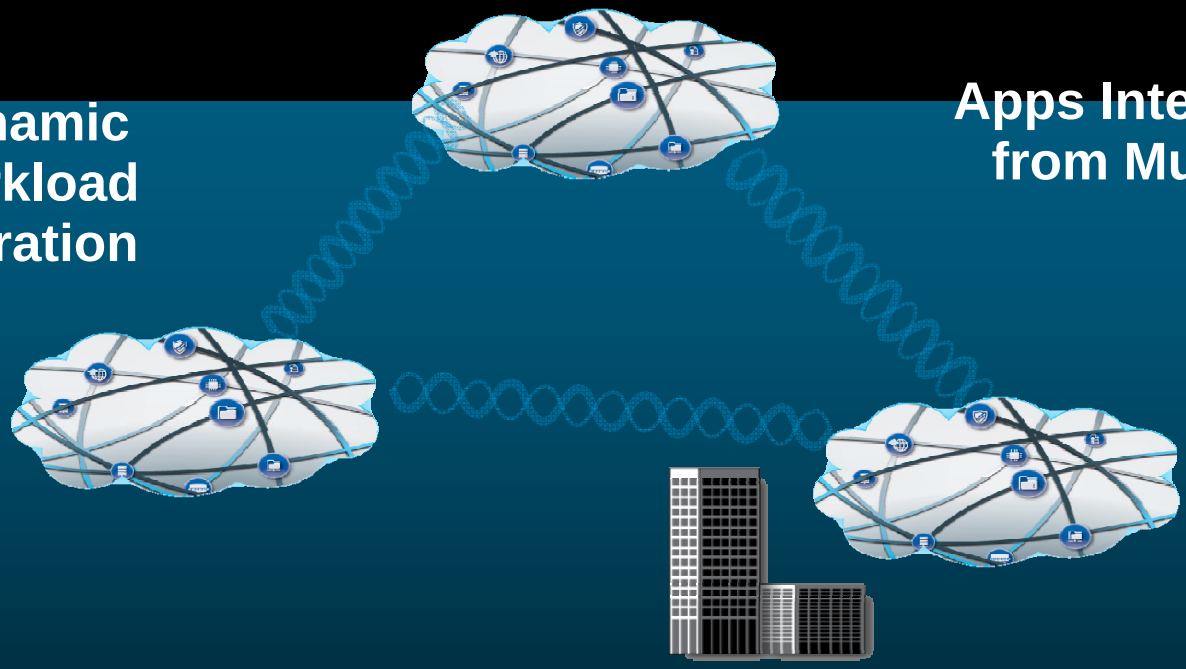
Cloud Adoption Phases



Vision—The Intercloud

Flexible Infrastructure and a New Application Platform

Dynamic Workload Migration



Apps Integrate Services from Multiple Clouds

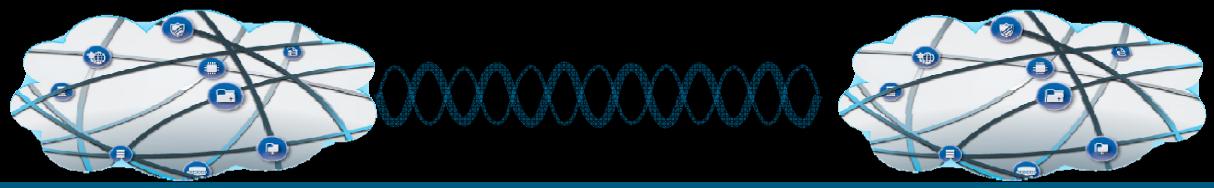
A Federation of Clouds Based on Open Standards:

- **Naming/Discovery**
- **Trust**
- **Exchange/Peering**

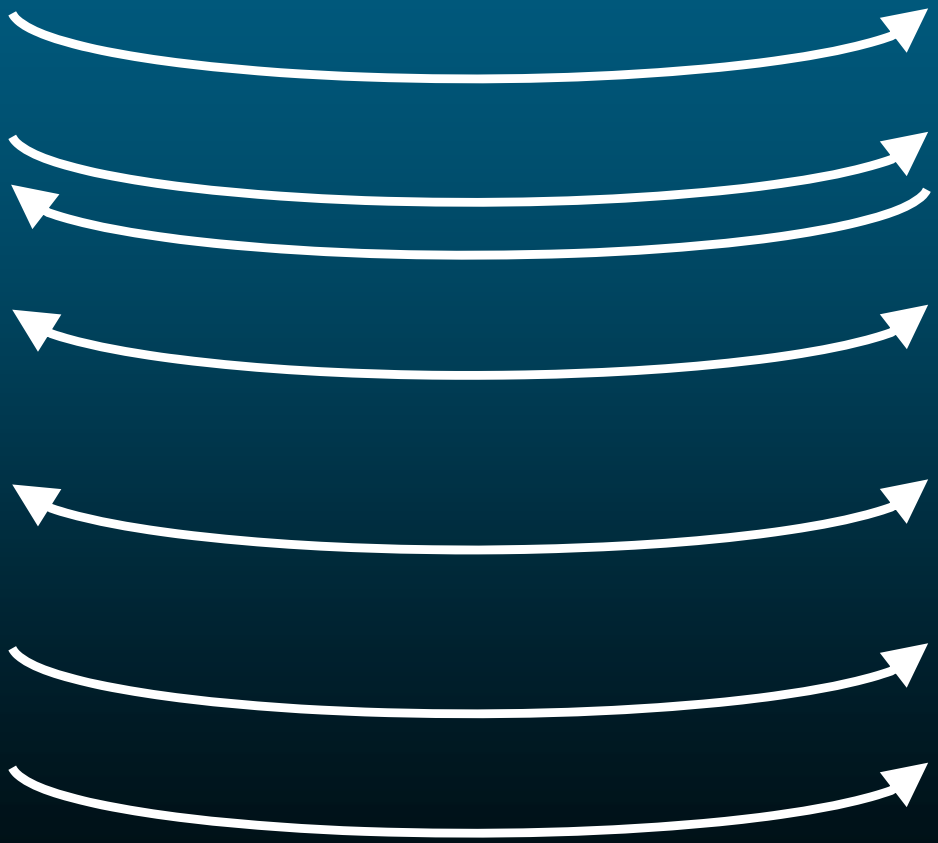
© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Intercloud Example

Dynamic Workload Migration – Simple VM Mobility



Cloud 1 / Cloud 2 transport
→ XMPP



Cloud 1 finds Cloud 2
→ Naming, Presence

Cloud 1 trusts Cloud 2
→ Certificates, Trustsec

Cloud 1/2 negotiate
→ Policy, Entitlement, Security, Metering

Cloud 1 sets up Cloud 2
→ Placement, Deployment, Format, Motion

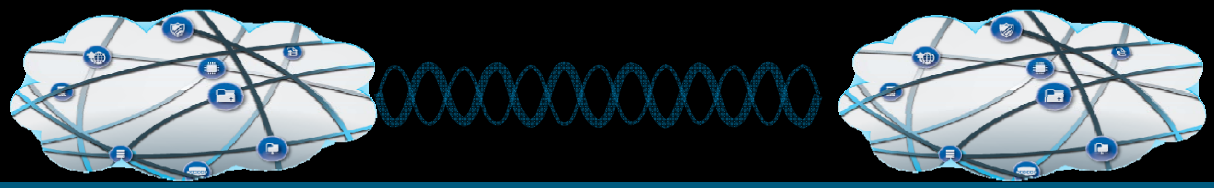
Cloud 1 sends to Cloud 2
→ Transfer, Management

VM Runs in Cloud 2
→ Addressing, VLAN, WWN, Filesystem

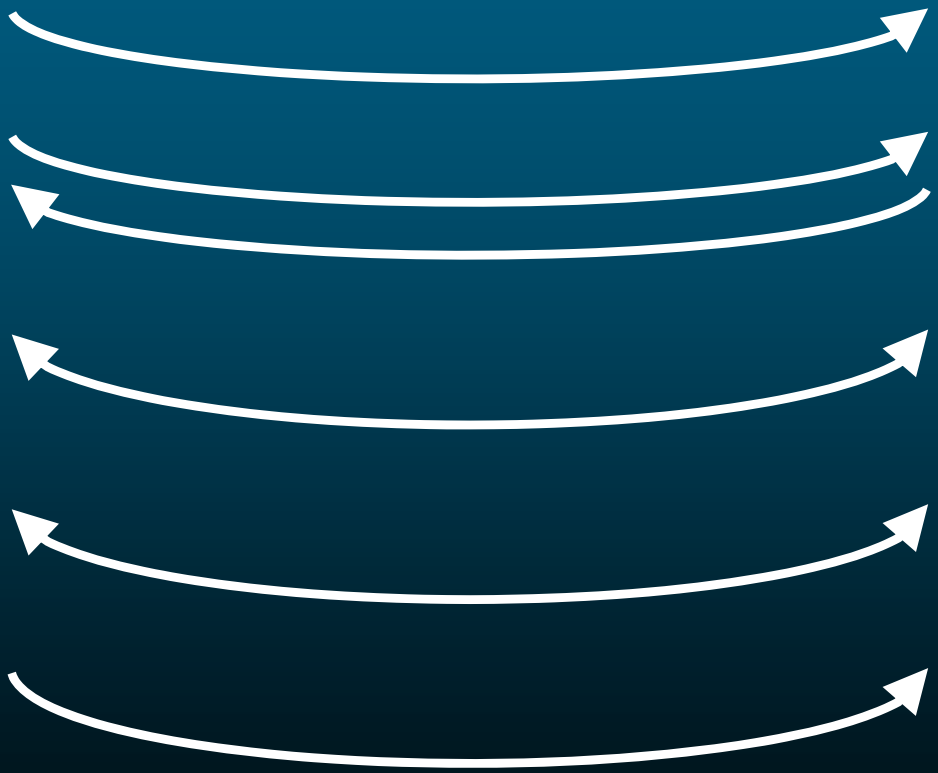
© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Intercloud Example

Dynamic Workload Federation – Generalized Service Access



Cloud 1 / Cloud 2 transport
→ XMPP



Cloud 1 finds Cloud 2
→ Naming, Presence

Cloud 1 trusts Cloud 2
→ Certificates, Trustsec

Cloud 1 queries Cloud 2 for Services
→ RDF/SPARQL, OWL

Cloud 1 selects; receives protocols, interface
→ Web Services; REST API

Cloud 1 calls services in Cloud 2
→ Metering, SLAs

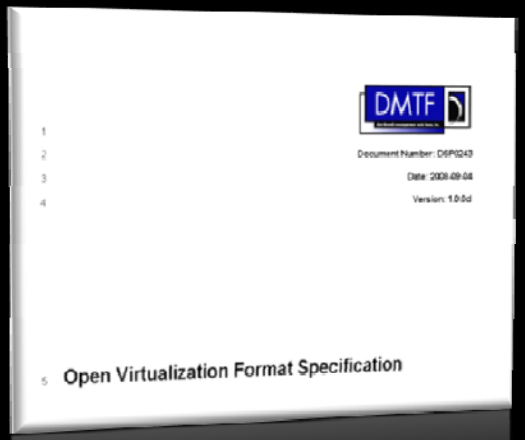
© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Specific Intercloud Projects

- Addressing – IETF LISP

- Conversations – XMPP.org

- UCI – W3C, Google Code



- Virtual Machines - DMTF OVF

- Distributed Storage Acceleration - opencloudconsortium.org, udt.sourceforge.net

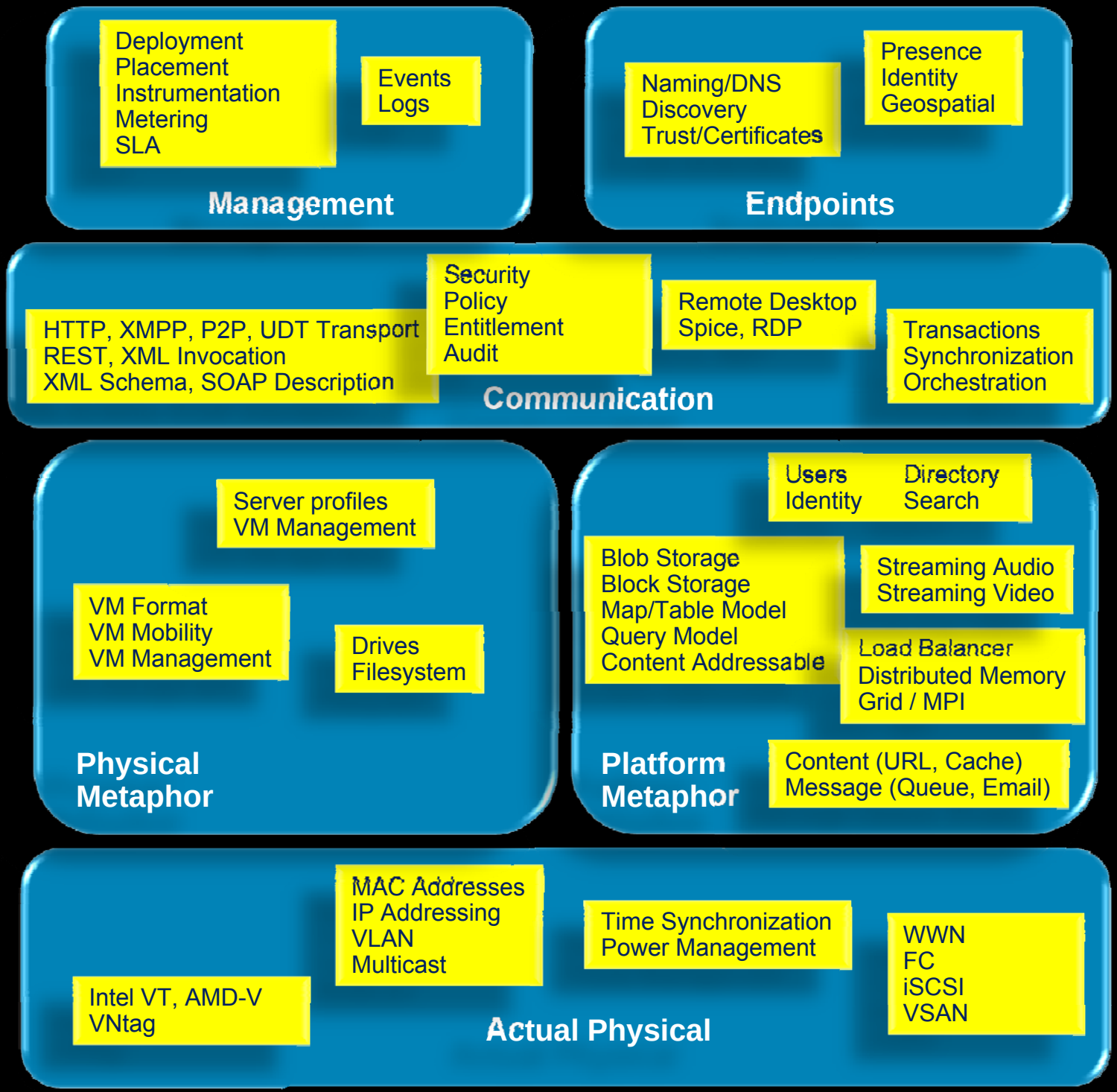
© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Intercloud Standards and Protocols Roadmap

Lots of Work to do

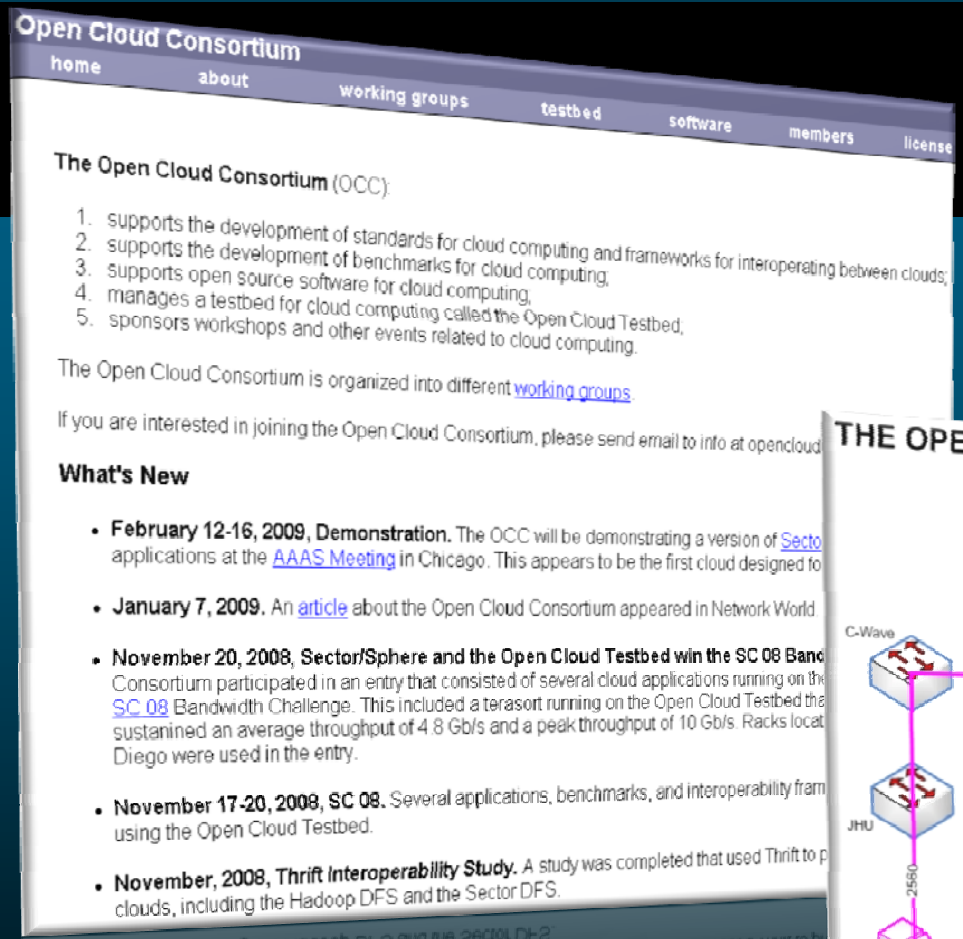
SOA approach and standards will be re-used heavily

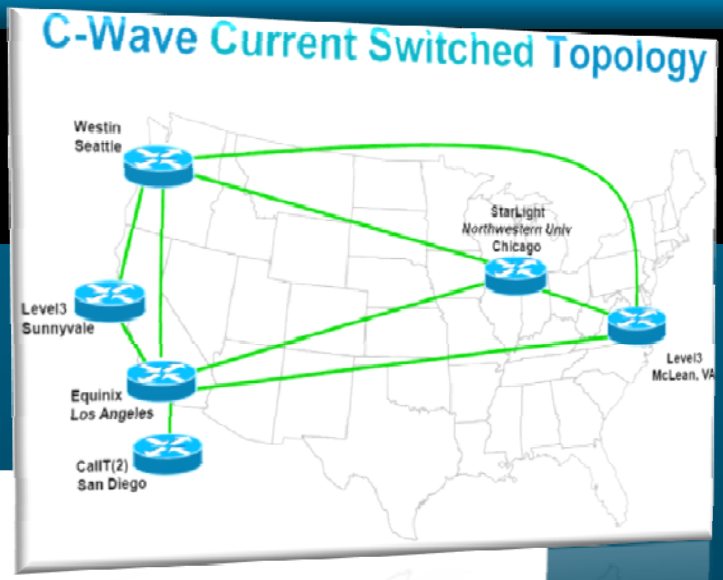
Some kind of Industry Association is inevitable

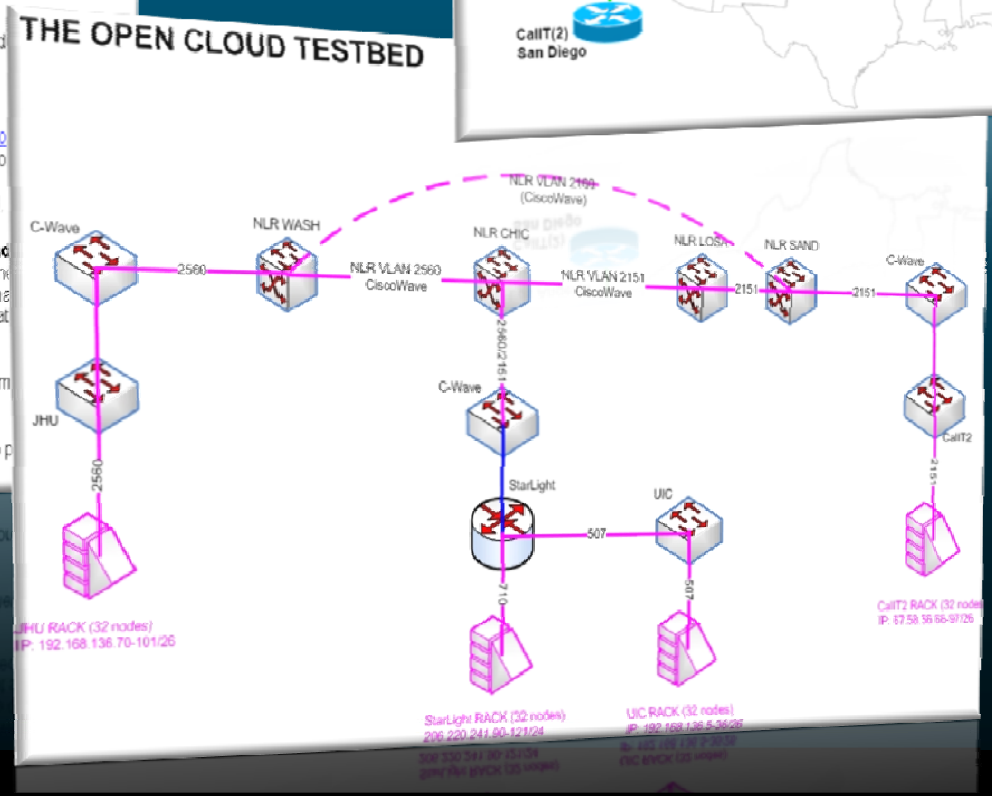


© 2008 Cisco Systems, Inc. All rights reserved. Cisco Confidential

Opencloud/Intercloud Testbed







© 2008 Cisco Systems, Inc. All rights reserved.


CISCO
TM